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EXAMINER

ILDEBRANDO, CHRISTINA A

ART UNIT PAPER NUMBER

1725

DATE MAILED: 02/06/2003

5

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

09/856,369

Applicant(s)

SHINJI YAMAMOTO

Examiner

Christina Ildebrando

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 21 May 2001.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-16 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-16 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on _____ is: a) ☐ approved b) ☐ disapproved by the Examiner.
- If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

- 13) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
 - ☐ Certified copies of the priority documents have been received in Application No. _____.
 - ☒ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).
- a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892) 4) ☐ Interview Summary (PTO-413) Paper No(s). _____
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948) 5) ☐ Notice of Informal Patent Application (PTO-152)
- 3) ☒ Information Disclosure Statement(s) (PTO-1449) Paper No(s) 4 6) ☐ Other:

DETAILED ACTION

Claim Rejections - 35 USC § 112

1. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

2. Claims 4-7 and 11 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.
3. Claim 4 recites the limitation "said HC reforming catalyst" and "said CO reforming catalyst component." There is insufficient antecedent basis for these limitations in the claims. These components have not been previously defined in claim 1, upon which claim 4 depends. It is not clear these components are required by the claims.
4. Claim 5 recites the limitation "said zirconium oxide." There is insufficient antecedent basis for this limitation in the claims. Zirconium oxide has not been previously defined in claim 1, upon which claim 5 depends. It is not clear these components are required by the claims.
5. Claims 6, 7, and 11 recite the limitations "said HC reforming layer," "said CO reforming layer", and "said upstream layer." There is insufficient antecedent basis for these limitations in the claims. These layers have not been previously defined in claim 1, upon which claims 6, 7, and 11 depend. It is not clear these components are required by the claims.

Claim Rejections - 35 USC § 102

6. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

7. Claims 1-4 and 6-16 are rejected under 35 U.S.C. 102(b) as being anticipated by Noda et al.

Noda et al. (EP 0 782 880) discloses a catalyst-adsorbent useful in the purification of exhaust gases. The catalyst-adsorbent comprises a monolithic carrier and a catalyst-adsorbent layer formed thereon (page 2, lines 50-60).

With respect to the HC adsorbent, Noda et al. teaches that the adsorbent particles are composed mainly of zeolite, preferably high-silica, hydrogen form zeolites having a Si/2Al of 40 or more (page 5, lines 15-20). Suitable zeolites include ZSM-5, USY, and Beta zeolite (page 5, lines 28-30). It is taught that the zeolites may be used singly or in combination (page 6, lines 35-45). The zeolite may further contain an ion such as Cu, Ag, or Au, or Mg, Ca, Sr, Ba, Y, La, Ti, Ce, Mn, Fe, Cr, Ni, and Zn (pages 5-6) to improve stability and heat resistance.

With respect to the catalyst, it is taught that the catalyst is mainly composed of catalyst particles each comprising a heat resistant inorganic oxide and at least one noble metal selected from Pt, Pd, and Rh located thereon (page 3, lines 40-50). The use Pd supported on CeO₂ and Rh supported on ZrO₂ is specifically taught (page 4, lines 25-50).

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In an example, Noda et al. specifically teaches a catalyst-adsorbent comprising a first layer of zeolite, a second layer of Rh-loaded ZrO_2 , and a third layer of Pd-loaded $\text{Al}_2\text{O}_3\text{-CeO}_2$ (Example 16). Mixed layers may also be used.

The statements of intended use recited throughout the claims are noted by the examiner. While intended use recitations cannot entirely be disregarded, in composition and article claims, the intended use must result in a structural difference between the claimed invention and the prior art in order to patentably distinguish the claimed invention over the prior art. *In re Casey*, 370 USPQ 235 and *In re Otto*, 312 USPQ 458. It is the position of the examiner that the prior art structure is capable of performing the intended use and therefore meets the instant claims.

Specifically, with regards to claims 3 and 6-7, the reference teaches a catalyst layer containing cerium oxide and alumina carrying palladium, and zirconium oxide carrying rhodium (Example 16), considered to correspond to the HC reforming catalyst, NOx reducing catalyst, and CO reforming catalyst respectively.

With regards to claim 4, the reference teaches a catalyst layer containing cerium oxide and alumina carrying palladium, and zirconium oxide carrying rhodium (Example 16), considered to correspond to the catalyst layer and upstream layer.

With regards to claim 11, the reference teaches that the HC adsorbent layer may contain a metal such as magnesium, calcium, or barium (page 6, lines 25-30), considered to meet the NOx reducing catalyst contained in the HC adsorbent layer.

With regards to claim 16, Table 2 (page 10) details an engine which generates an exhaust gas which meets the claimed hydrogen/reducing components ratio.

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As each and every element of the claimed invention is taught in the prior art as recited above, the claims are anticipated by Noda et al.

8. Claims 1-2, 4, 6-7, 11, and 15-16 are rejected under 35 U.S.C. 102(b) as being anticipated by Ikeda et al.

Ikeda et al. (EP 0 852 966) teaches a catalyst composition useful in the purification of exhaust gases. Ikeda et al. teaches that the catalyst comprises a first powder containing rhodium and zirconia and a second powder containing platinum, alumina, and a NO_x adsorbent (page 4, lines 20-30). The composition further contains a hydrocarbon adsorbent such as a zeolite (page 5, lines 50-60). In one embodiment, it is taught that the HC adsorbent may form a coating layer on a monolithic substrate wherein the first and second powder are supported on the coating layer (page 6, lines 1-40).

With regards to claims 1 and 2, it is taught by the reference that the first and second powder produce hydrogen from hydrocarbons and carbon monoxide in the exhaust gas and reduce nitrogen oxides with both the produced hydrogen and hydrocarbons and carbon monoxide in the exhaust gas (page 4, lines 20-60). The zeolite functions to store the HCs during cold operation of the engine and to release the HCs during warm operation (page 5, lines 30-58). It appears that the composition of the exhaust gas would meet the relation claimed in claim 15.

With regards to claim 4, 6, 7, and 11: it is taught that the second powder may further contain palladium (page 8, lines 10-25). The NO_x adsorbent, contained in the

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second powder, is formed of at least one element selected from the group consisting of alkaline metals, alkaline earth metals, and rare earth metals (page 8, lines 25-30).

As each and every element of the claimed invention is taught in the prior art as recited above, the claims are anticipated by Ikeda et al.

Claim Rejections - 35 USC § 103

9. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

10. Claim 5 is rejected under 35 U.S.C. 103(a) as being unpatentable over Noda et al. as applied above for claims 1-4 and 6-16 and further in view of Abe et al.

The teachings of Noda et al. are as described above for claims 1-4 and 6-16.

The difference between the reference and the claims is that Noda et al. does not teach the use of an alkaline earth metal in combination with the zirconium oxide as required by claim 5.

Abe et al. (US 5,164,350) discloses a layered catalyst composition useful in the purification of exhaust gases. Abe et al. teaches that the heat resistance of an inorganic oxide such as zirconium oxide may be improved by forming a compound oxide of zirconium and alkaline earth metal oxide (columns 5-6).

It would have been obvious to one having ordinary skill in the art at the time the invention was made to have modified the composition of Noda et al. to include the use

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of an alkaline earth metal in combination with the zirconium oxide in light of the teachings of Abe et al. One would have been motivated to do so to improve the heat resistance of the composition. Because both compositions can be used in the purification of exhaust gases, one would have reasonable expectation of success from the combination.

11. Claims 8-10 are rejected under 35 U.S.C. 103(a) as being unpatentable over Ikeda et al. as applied to claims 1-2, 4, 6-7, 11, and 15-16 above, and further in view of Noda et al.

The teachings of Ikeda et al. are applied as above for claims 1-2, 4, 6-7, 11, and 15-16.

Ikeda et al. does not teach the use of a beta zeolite as required by claims 8-9 or that the zeolite contains ions, as recited in claim 10.

Noda et al. (EP 0 782 880) teaches a catalyst-adsorbent useful in the purification of exhaust gases. With respect to the HC adsorbent, Noda et al. teaches that the adsorbent particles are composed mainly of zeolite, preferably high-silica, hydrogen form zeolites having a Si/2Al of 40 or more (page 5, lines 15-20). Suitable zeolites include ZSM-5, USY, and Beta zeolite (page 5, lines 28-30). It is taught that the zeolites may be used in combination to effect a wide variety of hydrocarbon adsorption (page 6, lines 35-45). The zeolite may further contain an ion such as Cu, Ag, or Au, or Mg, Ca, Sr, Ba, Y, La, Ti, Ce, Mn, Fe, Cr, Ni, and Zn (pages 5-6) to improve stability and heat resistance.

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It would have been obvious to one having ordinary skill in the art at the time the invention was made to have modified the invention of Ikeda et al. to include the use of beta zeolite in light of the teachings of Noda et al. Noda et al. teaches that beta zeolite is functionally equivalent to the zeolites taught by Ikeda et al. for HC adsorption in exhaust gas purification, thereby giving one of ordinary skill motivation to use it. One would have been further motivated to use combinations of zeolites in light of the teaching by Noda et al. that by doing so one would be able to adsorb a wider variety of hydrocarbons. Finally, one would have been motivated to include additional ions such as Cu, Ag, or Au, or Mg, Ca, Sr, Ba, Y, La, Ti, Ce, Mn, Fe, Cr, Ni, and Zn in light of the teaching by Noda et al. that doing so improves an improved composition.

Conclusion

12. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

13. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Christina Ildebrando whose telephone number is (703) 305-0469. The examiner can normally be reached on Monday-Friday, 7:30-5, with Alternate Fridays off.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Tom Dunn can be reached on (703) 308-3318. The fax phone numbers for the organization where this application or proceeding is assigned are (703) 872-9310 for regular communications and (703) 872-9311 for After Final communications.

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Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (703) 308-0651.

CAI
February 1, 2003



TOM DUNN
SUPERVISORY PATENT EXAMINER
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